APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,492	04/01/2004	Tarek Eldin	X-1481 US	8518

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ART UNIT	PAPER NUMBER
2138	

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Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	10/815,492	ELDIN ET AL.
	Examiner	Art Unit
	Saqib J. Siddiqui	2138

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>01 April 2004</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-25</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-25</u> is/are rejected.

7)☒ Claim(s) <u>23-25</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>01 April 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>04/01/04</u>.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Oath/Declaration

The Oath filed April 01, 2004 complies with all the requirements set fort in

MPEP 602 and therefore is accepted.

Drawings

The filed drawings are accepted.

Specification

The contents of the filed specification are accepted.

Claim Objections

Claims 23-25 are objected to because of the following informalities:

As per claim 23:

This claims refers to point";" (line 12), whereas it should read point.

Applicant should replace the ";" with a period.

As per claims 24-25:

These claims are objected to by virtue of their dependency.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35

U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an

international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1-10, 13-18, & 20-25 are rejected under 35 U.S.C. 102(e) as being unpatentable over Dastidar et al. US Patent no. 7,024,327 B1.

As per claim 1:

Dastidar et al. teaches a method of isolating a fault on a line segment of a switch matrix comprising (columns 1-2, lines 65-2): generating a first route between an input of the switch matrix and an output of the switch matrix through a first programmable interconnect point (Figure 1 # 121, column 2, lines 10-25) on the line segment and through a first adjacent programmable interconnect point (column 3, lines 32-35); configuring the first route in the switch matrix (column 2, lines 25-30); applying a first test vector at the input (column 2, lines 30-35); measuring first test data at the output (column 2, lines 30-35); storing the first test data (Figure 1 # 123, column 3, lines 10-25) and at least a portion of the first route (Figure 1 # 113); generating a second route between the input and the output (column 3, lines 25-30) through the first programmable interconnect point

on the line segment and through a second adjacent programmable interconnect

point (column 3, lines 32-35), configuring the second route in the switch matrix

(column 3, lines 25-30); applying a second test vector at the input (column 3,

lines 30-32); measuring second test data at the output (column 3, lines 25-36);

and storing the second test data and at least a portion of the second route

(column 3, lines 25-35).

As per claim 2:

Dastidar et al. teaches the method as rejected in claim 1 above, wherein a

path from the adjacent programmable interconnect point to one of the input and

the output is generated by an auto- route tool (Figure 3, # 302).

As per claim 3:

Dastidar et al. teaches the method as rejected in claim 2 above wherein

the path excludes the line segment (column 4, lines 50-60).

As per claim 4:

Dastidar et al. teaches the method as rejected in claim 1 above wherein

the first adjacent programmable interconnect point is on the line segment

(column 4, lines 46-48).

As per claim 5:

Dastidar et al. teaches the method as rejected in claim 1 wherein the

switch matrix is incorporated in a programmable logic device (columns 1-2, lines

65-2).

As per claim 6:

Dastidar et al. teaches the method as rejected in claim 1 wherein the

second test vector is the same as the first test vector (column 3, lines 55-65).

As per claim 7:

Dastidar et al. teaches the method as rejected in claim 1 wherein the step

of generating the second route is performed prior to the step of applying the first

test vector (column 2, lines 20-25).

As per claim 8:

Dastidar et al. teaches the method as rejected in claim 7 above wherein

the first route and the second route are stored in a route directory (Figure3 # 303,

column 5, lines 10-15).

As per claim 9:

Dastidar et al. teaches the method as rejected in claim 1 above further

comprising a step of evaluating the first test data and the second tests data

against a layout schematic of a programmable logic device (Figure 3 # 301,

column 4, lines 50-20)

As per claim 10:

Dastidar et al. teaches the method as rejected in claim 1 above wherein

the first test vector comprises a first series of first digital test values followed by a

second series of second digital test values followed by a third series of the first

digital test values (column 6, lines 1-20).

As per claim 13:

Dastidar et al. teaches the method as rejected in claim 1 above, wherein the line segment includes at least four programmable interconnect points (column 4, lines 46-48).

As per claim 14:

Dastidar et al. teaches a method of isolating a fault on a line segment of a switch matrix comprising: (a) identifying original programmable interconnect points (PIPs') in the line segment (column 4, lines 1-11); (b) looking up adjacent PIPs in a PIPS database, each of the adjacent PIPs being adjacent to at least one original PIP (Figure 3 # 301, column 4, lines 1-11); (c) generating a first route through a first port of the switch matrix to an Nth original PIP where N is an integer (column 4, lines 43-46); (d) adding a second route from the Nth original PIP to an Mth adjacent PIP where M is a second integer (column 3, lines 43-46); (e) adding a third route from the adjacent PIP to a second port of the switch matrix (column 3, lines 43-60); (f) storing a route including the first route, second route, and third route in a route directory (Figure 1 # 113, column 3, lines 25-35); (g) repeating steps (d), (e) and (f) for all adjacent PIPs adjacent to the original PIP (column 3, lines 25-36); (h) repeating steps (c), (d), (e), (f) and (g) for all original PIPs (column 3, lines 25-36); (i) configuring the route in the switch matrix (column 3, lines 25-30); (j) applying a test vector at an input of the route (column 2, lines 30-35); (k) reading test data at an output of the route (column 6, lines 5-13); (l) storing the test data (Figure 1 # 123, column 3, lines 10-25); and (m) repeating steps (i), (j), (k) and (1) for all routes in the route directory (column 3, lines 25-36).

As per claim 15:

Dastidar et al. teaches a system of isolating a fault on a line segment of a

switch matrix comprising: means for identifying original programmable

interconnect points on the line segment (column 4, lines 1-11); means for

identifying programmable interconnect points adjacent to each of the original

programmable interconnect points (Figure 3 # 301, column 4, lines 1-11); means

for generating routes between an input of the line segment and an output of the

line segment through each of the programmable interconnect points adjacent to

each of the original programmable interconnect points (column 4, lines 43-46);

and means for testing the routes (column 2, lines 30-35).

As per claim 16:

Dastidar et al. teaches a system for fault isolation on a line segment in an

integrated circuit (IC) having at least one programmable interconnection (column

3, lines 32-35), the system comprising: a database having the at least one

programmable interconnection in the IC (column 4, lines 1-11); having a test path

generation software module (Figure 3, # 302), the test path generation software

module comprising: code for identifying original programmable interconnections

on the line segment having a fault (column 4, lines 1-11); code for identifying

programmable interconnections adjacent to the original programmable

interconnect points (Figure 3 # 301, column 4, lines 1-11); code for generating

routes between an input of the line segment and an output of the line segment

through the original programmable interconnections and through the

programmable interconnections adjacent to the original programmable

interconnections (column 4, lines 43-46); and a tester coupled to the processor

and the IC having the line segment, the tester for testing the line segment using

the generated routes (column 6, lines 5-20).

As per claim 17:

Dastidar et al. teaches the system as rejected in claim 16 above further

comprising, a failure analysis software module stored in the memory and

configured to receive test results related to the line segment from the tester

(column 9, lines 1-12) and to perform fault isolation analysis on the received test

results (column 9, lines 12-15).

As per claim 18:

Dastidar et al. teaches the system as rejected in claim 16 above further

comprising: a test input file comprising the generated routes and test vectors for

the generated routes (Figure 3 # 303), the file sent to the tester by the processor

(column 6, lines 1-20); a test results file comprising the test results on the line

segment from the tester (column 9, lines 1-20); and a failure analysis module

stored in the memory for evaluating contents of the test results file (column 9,

lines 1-20).

As per claim 20:

Dastidar et al. teaches the system as rejected above in claim 16 wherein

the database further comprises the original programmable interconnections

(column 4, lines 1-11) and the programmable interconnections adjacent to the

original programmable interconnections (Figure 3 # 301, column 4, lines 1-11).

As per claim 21:

Dastidar et al. teaches the system as rejected above in claim 16 wherein

the IC comprises a programmable logic device (PLD) (columns 1-2, lines 65-2).

As per claim 22:

Dastidar et al. teaches the system as rejected above in claim 21 wherein the

database further comprises all the original programmable interconnections on the

PLD (Figure 3 # 301, column 4, lines 1-11).

As per claim 23:

Dastidar et al. teaches a method for fault isolation on a line segment in an

integrated circuit (IC) having at least one programmable interconnection (column

3, lines 32-35), the method comprising: identifying an original programmable

interconnection point on the line segment having a fault (column 4, lines 1-11);

identifying an output programmable interconnection points adjacent to the

original programmable interconnection point (Figure 3 # 301, column 4, lines 1-

11); and generating a route between an input of the line segment and an output

of the line segment through the original programmable interconnection point and

through the output programmable interconnection point (column 4, lines 43-46).

As per claims 24 & 25:

Claims 24 & 25 are directed to a method of the system of Claims 16-22. Dastidar

et al. teaches as stated above, the system as set forth in Claims 16-22.

Therefore, Dastidar et al. also teaches as stated above, the method as set forth

in claims 24 & 25.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for

all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1,

148 USPQ 459 (1966), that are applied for establishing a background for

determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 11, 12, & 19 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Dastidar et al. US Patent no. 7,024,327 B1.

As per claims 11 & 12:

Dastidar et al. teaches the method as rejected in claim 10.

Dastidar et al. does not explicitly teach a method wherein there are' at

least three first digital test values in the first series and there are at least three

second digital test values in the second series.

However, it would have been obvious to one of ordinary skill in the art to

have at least three digital test values in the first and second test series, since one

of ordinary skill in the art would have recognized that Dastidar et al. is already

using functional digital test data vectors to test the device (column 6, lines 1-20).

These functional test vectors include test vectors, expected results and test values; hence it would be obvious to represent them with three different digital test values. In addition it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum range or workable range involves only routine skill in the art. *In re Aller,* 105 USPQ 233.

As per claim 19:

Dastidar et al. teaches the system as rejected above in claim 18.

Dastidar et al. does not explicitly teach the system wherein information used by the tester from the test input file is modified based on feedback from the failure analysis module.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the test input file based on feedback from the failure analysis module because one of ordinary skill in the art would have realized that doing so would enable Dastidar et al.'s invention to cross check for a diverse number of errors. Further it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum range or workable range involves only routine skill in the art. *In re Aller,* 105 USPQ 233.

Related Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Additional pertinent prior arts, US Pat no. (6694464 B1, 6470485 B1, and 6725442 B1) mention the same interconnection testing system wherein test vectors are scanned after generating routes.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saqib J. Siddiqui whose telephone number is (571) 272-6553. The examiner can normally be reached on 8:00 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Saqib Siddiqui
Art Unit 2138
04/04/2006

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